Studio 5: Healthcare Design Studio (TherAplay Children Foundation)

Students in the Interior Design Studio 5 course in Fall 2018 designed a new floor plan to be applied in TherAplay, in Fall 2019 students designed a new pieces of furniture then in Fall 2020 students modified the designed pieces and finished a post occupancy evaluation. conduct post occupancy evaluations of newly designed rooms for TherAplay, a therapy center for children with disabilities. Furniture and other aspects of the center had been designed by previous students. They will collaborate with one another to study the effects of their design decisions on the children using the space and work together to create something beneficial to these children in need.

Faculty Mentor: Professor Shireen Kanakri

Construction Manangment and Interior Design Department

College of Architecture and Planning

TherAplay Children Foundation

Physical and Occupational Therapy with Horsepower

The Children's TherAplay Foundation, Inc. is the largest pediatric hippotherapy facility in the country, providing **physical and occupational therapies *using equine movement as a treatment tool*** for children with special needs such as cerebral palsy, Down syndrome, autism spectrum disorders, spina bifida, traumatic brain injury, developmental delays, and more.

Our therapists combine a sensory-rich, child-centered clinic with **hippotherapy** – physical or occupational therapy using the horse as a treatment tool – to provide inputs that help children reach their developmental goals.

A child with a special need wants to learn, develop and achieve all the things their siblings and peers do. *Children's TherAplay helps make their dreams of independence a reality.*

https://www.childrenstheraplay.org/

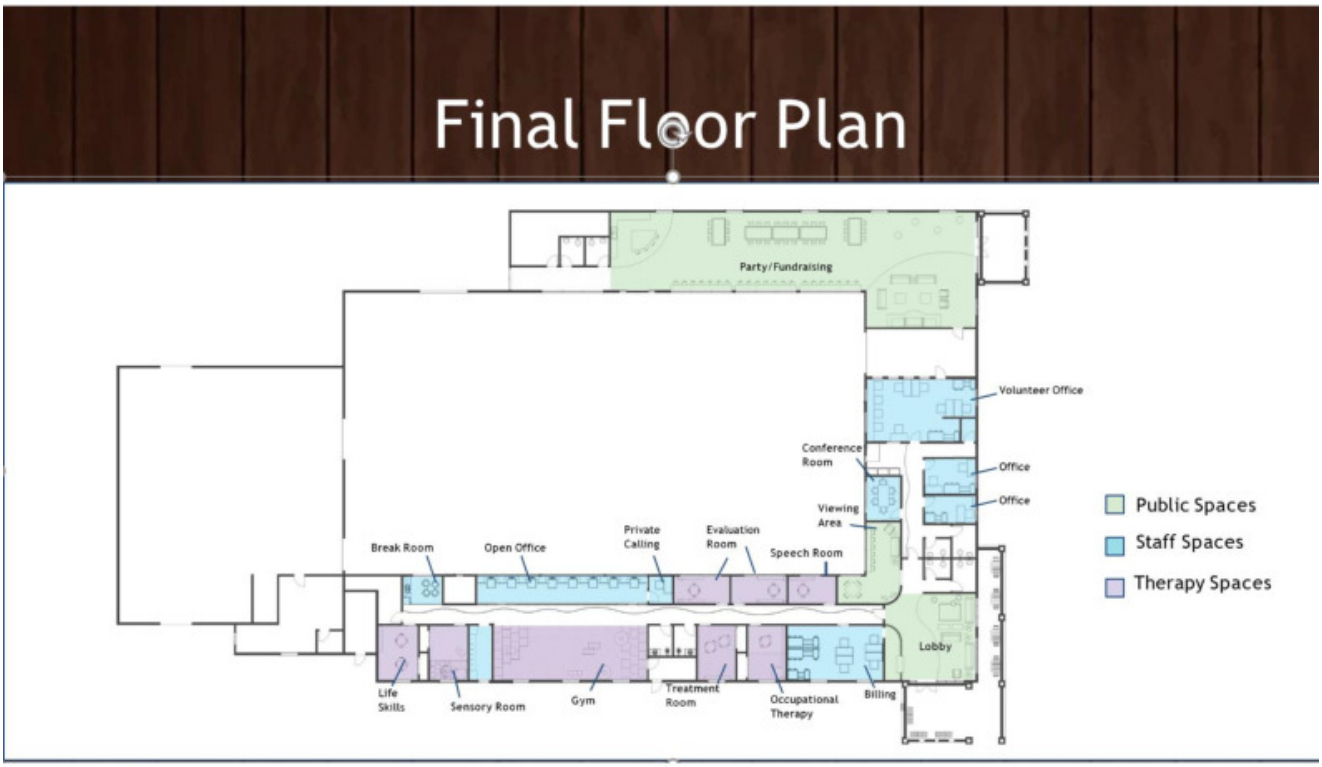
Students work 2018 →
TherAplay Children Foundation

Students work 2018

Students in the Interior Design Studio 5 studied the evidence-based design theory and applied the knowledge on redesign the whole facility in TherAplay. They collaborated with one another to study the effects of their design decisions on the children using the space and work together to create something beneficial to these children in need.

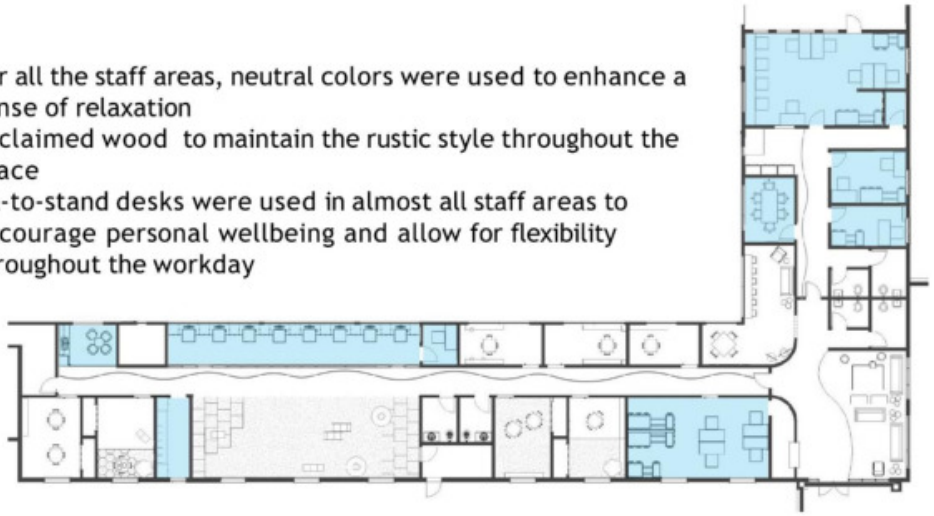
2018 work example

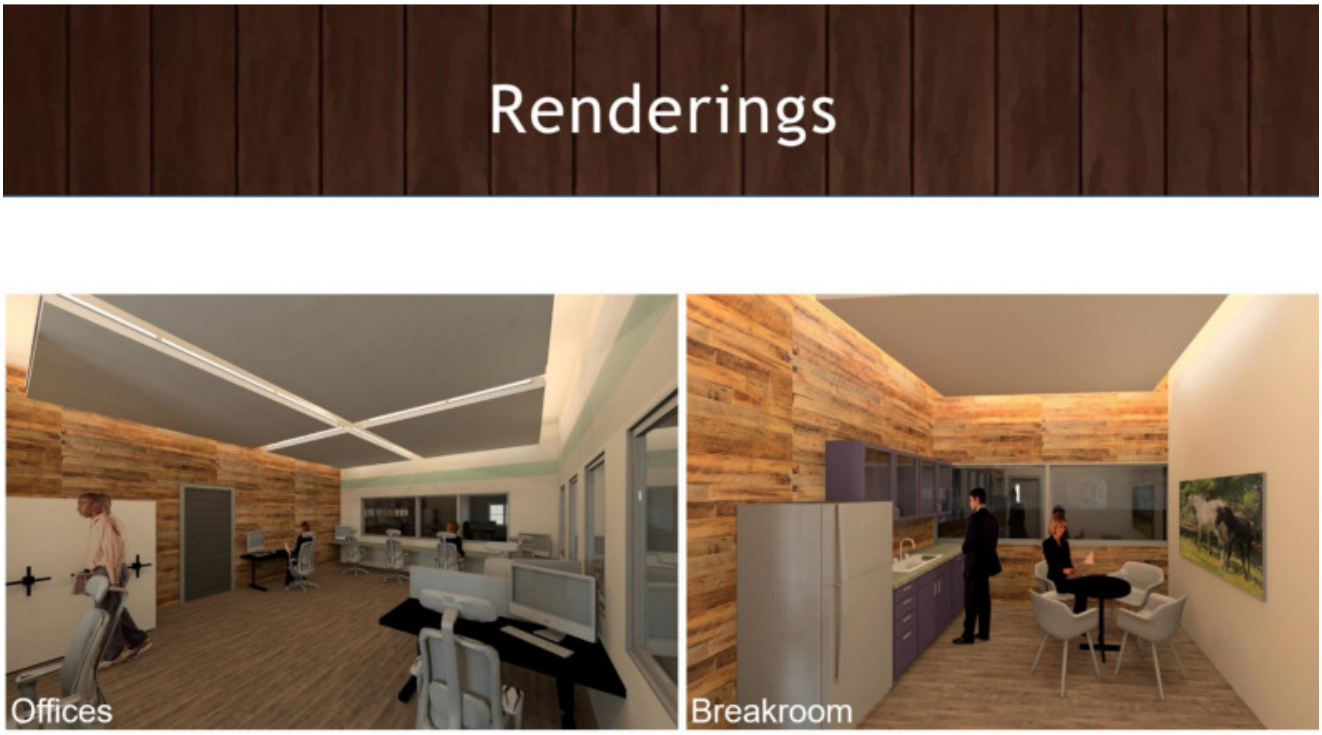
digitalresearch.bsu.edu/immersive-learning-showcase-2021/exhibits/show/studio-5--healthcare-design-st/2018-work-example



Staff Areas

- For all the staff areas, neutral colors were used to enhance a sense of relaxation
- Reclaimed wood to maintain the rustic style throughout the space
- Sit-to-stand desks were used in almost all staff areas to encourage personal wellbeing and allow for flexibility throughout the workday





← Students work 2018
Students projects from Fall 2019 →
2018 work example

Studio 5: Healthcare Design Studio (TherAplay Children Foundation)

- TherAplay Children Foundation
- Students work 2018
- 2018 work example
- Students projects from Fall 2019
- 2019 Student Work Example
- Design Projects Fall 2020
- 2020 Student Work Example

Students projects from Fall 2019

Watch Video At: https://youtu.be/aVzuapwm7Ok

Students applied the evidance based design knowledge to design pices of furniture to be used in TherAplay.

lren's TherAplay

and Sensory Table

ren's TherAplay Foundation is a not-for-profit
utpatient clinic in Carmel, Indiana that serves
children with special needs.
of the few clinics in the country dedicated
ding physical and occupational therapies on
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when the table is folded up, and when the table
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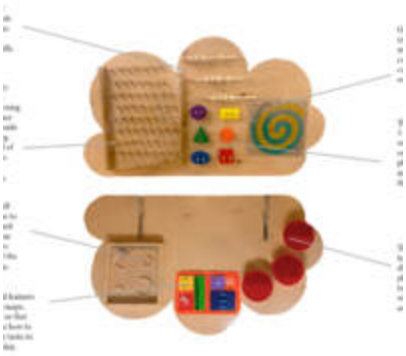
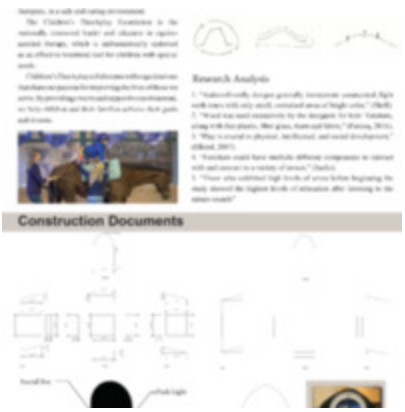
children with different skills.




Process:
1
2
3
Final Furniture Piece


Research Analysis
Construction Documents

Process

Student 2019

Skip to main content

TherAplay site visit

Dublin Core

Title

TherAplay site visit

Publisher

Kanakri

In the lab

Dublin Core

Title

In the lab

Citation

“In the lab,” *Immersive Learning Showcase 2021*, accessed July 28, 2021, https://digitalresearch.bsu.edu/immersive-learning-showcase-2021/items/show/376.

Cover page

Skip to main content

Dublin Core

Title

Cover page

Publisher

Kanakri

2019-Theraplay poster

Skip to main content

Children's TherAplay

Sensory Wall and Sensory Table

The Children's TherAplay Foundation is a not-for-profit pediatric outpatient clinic in Carmel, Indiana that serves children with special needs.
It is one of the few clinics in the country dedicated to providing physical and occupational therapies on horseback, through an innovative treatment strategy called hippotherapy.
I have designed a fold down table that features activities on one side when the table is folded up, and when the table is folded down there are more activities on the table side. Each activity on this piece will allow therapists to help children with different skills.

Sliding beads pipes allow children to move the beads from side to side along the dowels. This activity will help with hand motor skills.

Plinko board is an activity where children will drop bouncy balls into the opening at the top. The balls bounce around the pegs in the inside and come out the opening at the bottom. The sound of the balls bouncing creates a rainfall sound which is soothing and comforting.

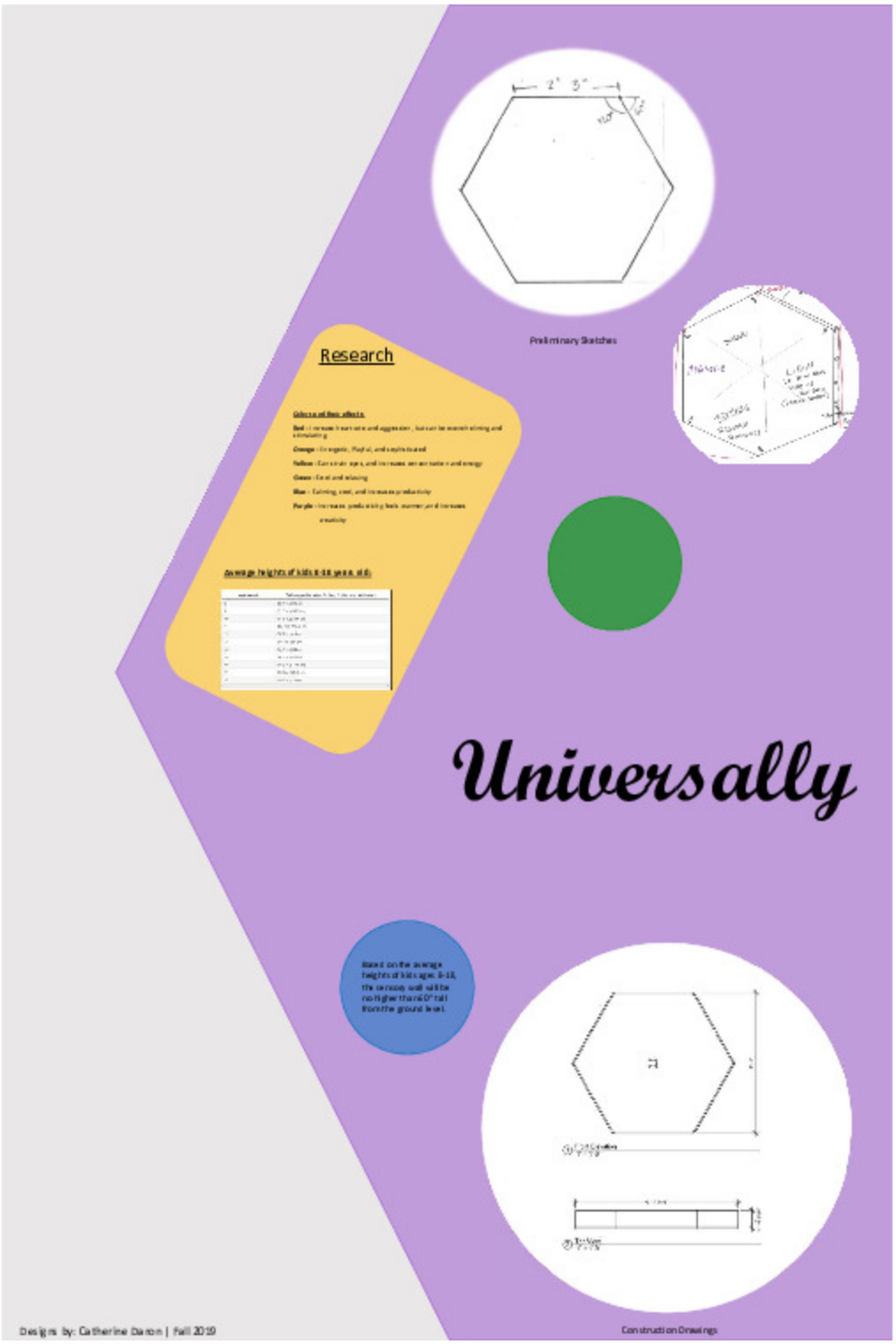
Gel pad maze has beads inside that children can move throughout the circular maze. There is two colors of gel and glitter within this gel pad.

These colored shapes have 3 of each shape and sit on wooden pegs. Children can remove these shapes and play with them and then match them back to where they go on the pegs.

This magnetic maze will help children learn how to hold a pencil and control their hand. They will use a magnetic pen to move the balls inside around the maze and into the rings.

The activity board features buckles, buttons, snaps, ties, and a zipper so that children can learn how to do these everyday tasks to get dressed everyday.

These three containers have rice, sand, and noodles inside. Children can play and feel the different textures of these things which can be therapeutic and comforting.


Research
Colors and their effects:
Red - it increases heart rate and aggression , but can be overstimulating and stimulating
Orange - Energetic, Playful, and sophisticated
Yellow - Can create eye, and increases serotonin and energy
Green - Quiet and relaxing
Blue - Calming, cool, and increases productivity
Purple - Increases productivity feels warmer and increases creativity
Average heights of kids 8-10 years old:
Universally
Based on the average heights of kids ages 8-10, the canopy wall will be no higher than 6' tall from the ground level.
Preliminary Sketches
Construction Drawings
Designs by: Catherine Daron | Fall 2019

The *Living* Wall

biophilic presence | sensory impact | interaction opportunity

SITE: Children's TherAplay is a clinic located in Carmel, Indiana that is dedicated to serving children with special needs through interaction with therapists via hippotherapy and occupational therapy.

ABOUT: The Living Wall will be placed in the sensory or gym area of Children's TherAplay in Carmel, Indiana. With this in mind, the concept of tranquility was a focus for the project. Tranquility is the quality or state of being FREE from AGITATION of mind or spirit and FREE from DISTURBANCE or TURMOIL. We want to support a peaceful area that represses cognitive hindrances and encourages progression of the children who will use the space. The Living Wall provides an opportunity for children to interact with nature while in a safe environment. They will be able to touch and water the various plants while viewing the unique colors and qualities of each. It is our hope that this installation will be a supportive and calming addition to Children's TherAplay for many years to come.

Process:

1

2

The first step in the construction of The Living Wall was to create a box that would eventually house the soil and plants. A piece was inserted in the middle to help support the future irrigation system. PVC piping was inserted to provide irrigation via holes drilled into the sides. Plastic sheeting was also added to line the box and make it waterproof.

3

4

Final Furniture Piece

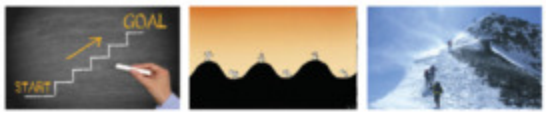
Design Development

Who is TherAPlay?

The mission of The Children's TherAplay Foundation is to provide children with special needs a foundation for developing life skills through innovative therapies, including equine-assisted physical and occupational therapies, in a safe and caring environment.

The Children's TherAplay Foundation is the nationally renowned leader and educator in equine-assisted therapy, which is enthusiastically endorsed as an effective treatment tool for children with special needs.

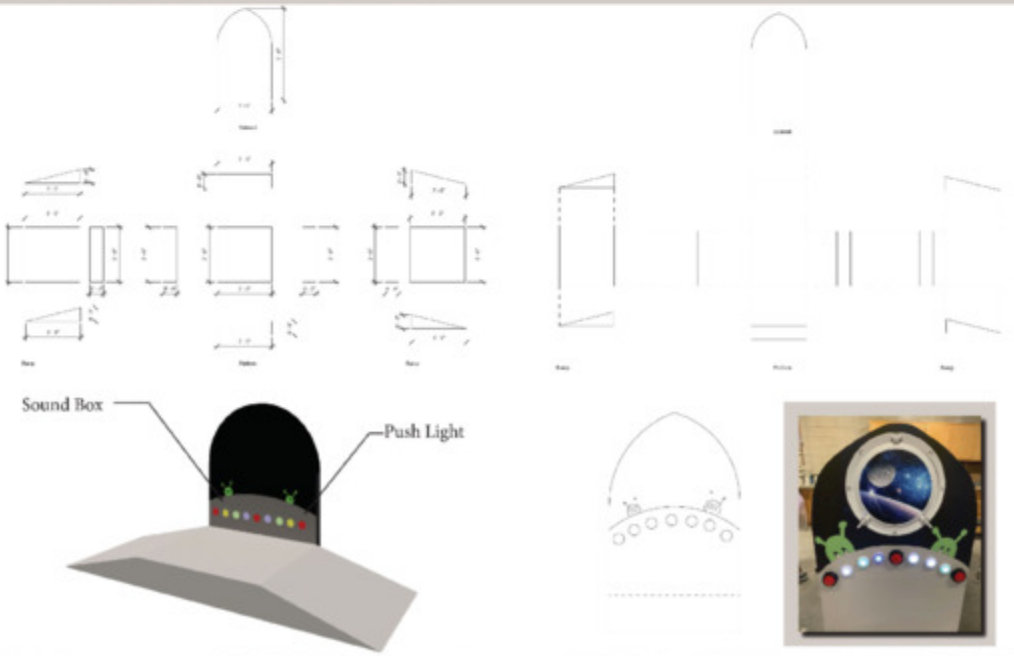
Children's TherAplay collaborates with organizations that share our passion for improving the lives of those we serve. By providing a warm and supportive environment, we help children and their families achieve their goals and dreams.



Research Analysis

1. "Autism-friendly designs generally incorporate unsaturated, light earth tones with only small, contained areas of bright color," (Shell).
2. "Wood was used extensively by the designers for kids' furniture, along with that plastic, fiber glass, foam and fabric," (Farooq, 2016).
3. "Play is crucial to physical, intellectual, and social development," (Elkind, 2007).
4. "Furniture could have multiple different components to interact with and connect to a variety of senses," (Sacks).
5. "Those who exhibited high levels of stress before beginning the study showed the highest levels of relaxation after listening to the nature sounds"

Construction Documents

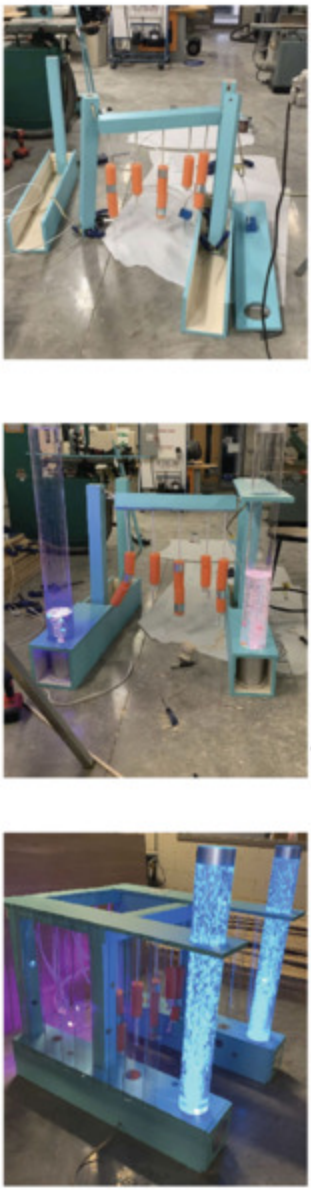


Children's TherAplay - Emma Birch and Susan Lamermayer - Dr. Kanakri - Fall 2019

Children's TherAplay

The Children's TherAplay Foundation, Inc.

Design Process



ARTICLE 1

An Early Start for your Child with Autism

- Toys should have a main theme to allow for the recognition of ways things work in the world.
- Meeting a main theme helps them learn which action goes with each object.
- Variation should be added to play by:
  1. adding more pieces
  2. adding more actions
  3. adding more phases or stages

ARTICLE 2

Visual-Based Training Program for Motor Functions in Cerebral Palsied Children with Cortical Visual Impairment

- Using materials that offer light and dark, movement and very vivid colors are the first stages in stimulating vision in order to look with understanding
- The sensory lights for children provide visual challenges and eye catching form that inspires visual input and development.
- The act of reaching is beneficial for muscles and practices hand-eye coordination

ARTICLE 3

The Multisensory Playground Experience

- Crawling helps to develop balance, strengthen muscle tone and to develop eye-hand coordination.
- The crawling movement is repetitive and this stimulates brain activity to develop cognitive processes such as concentration, memory, comprehension and attention.
- The exploration of touch, sight, and sound uses a child's cognitive, tactile, visual, auditory, motor, language and social skills.

ARTICLE 4

Hazel Court Community Special School

- Some children prefer to interact with toys by physically feeling and seeing in close proximity to their face.
- Some children that have physical difficulties find it easiest to look upwards

ARTICLE 5

Sensory Integration and Therapy in Sensory Room

- **Sounds** with the linked imagery **allows to create a true experience**
- Optical fibers guide visual attention

Children's TherAplay

The Children's TherAplay Foundation, Inc.

Overview:

This project was created for The Children's TherAplay Foundation located in Carmel, IN. The client hired the Ball State College Design Center to create custom furniture and equipment for their therapy gym and sensory room. After visiting TherAplay, the client made a comment about their existing climbing wall. It was not helpful or challenging for the older children that they work with. The foundation helps children ranging from the ages of 18 months to 13 years old with special needs using horse therapy. They spend an hour with the children on/around the horses, then they work with the child for another hour in the sensory room or gym based off of their needs.

This tree climbing wall was designed to be challenging, yet safe for the children to use up to the age of 13 years old. The design allows for the therapist to customize the wall's climbing difficulty level according to the child using it. It is a 4'x8' wall that is braced and attached to the corner of their gym. The holes to change the grip "rock" locations are staggered 8" apart along the face of the board. The grips are easily removed and reattached using a square allen wrench and tee nuts.

Evidence Based Design:

The tree shape was chosen based off of evidence found in 2 articles; *Health Care Environments and Patient Outcomes* by Ann Sloan Devlin and Allison B. Arneill and *Effects of Healthcare Environmental Design on Medical Outcomes* by Roger S. Ulrich.

"The role of the environment in the healing process is a growing concern among health care providers, environmental psychologists, consultants, and architects (Devlin, 1997, 1995; Martin, Hunt, & Conrad, 1990; Raga, 1989; Ulrich, 1992, 1995)." (Delvin & Arneill 665)

"Researchers have found that people much prefer scenes of nature to cityscapes and urban environments (Kaplan, Kaplan, & Wendt, 1972), that scenes of nature have more positive effects on physiological states." (Delvin & Arneill 681)

"While short-term exposures to nature can foster impressive stress recover, it seems possible that well-ness benefits may tend to be greatest in certain situations involving long duration exposures to nature." (Ulrich 103)

"Heart rate measurements also indicated that individuals were less stressed or tense when the nature mural was visible." (Ulrich 103)

For this reason, a tree design and outline was chosen to be created on the facade of the rock climbing structure. By adding this element, we have added a calming background for other activities, visual interest, and the ability for the children to set height goals.

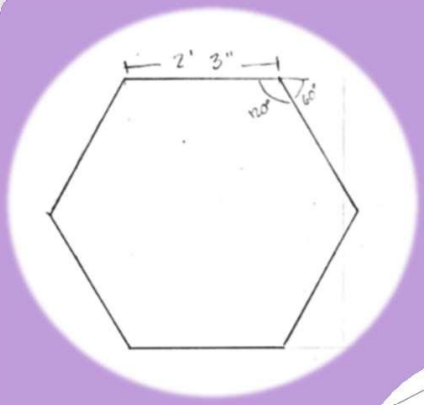
Materials List:	Quantity:
4"x4"x12' Wood	3
2"x4"x12' Wood	2
4'x8'x3/4" Plywood Sheet	1
4'x8'x1/2" Plywood Sheet	1
#9 x 3" Screws	44
¼-20 "ee Nut Screws	50
¼-20 Bolt Screws	50
1/4" Washers	50
Rock Climbing Holds	20
Finish Paint - Green	Pint
Finish Paint - Blue	Pint
Finish Stain – American Chestnut	Pint
Finish Polyurethane – Semi-Gloss	Pint

Process:

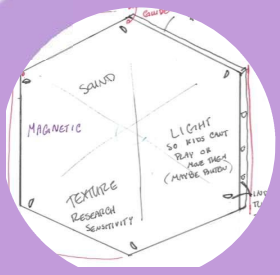
Dublin Core

Title

2019-Theraplay poster



Preliminary Sketches



Research

Colors and their effects:

Red - Increase heart rate and aggression, but can be overwhelming and stimulating

Orange - Energetic, Playful, and sophisticated

Yellow - Can strain eyes, and Increases concentration and energy

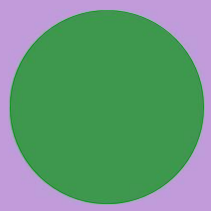
Green - Cool and relaxing

Blue - Calming, cool, and increases productivity

Purple - Increases productivity, feels warmer, and increases creativity

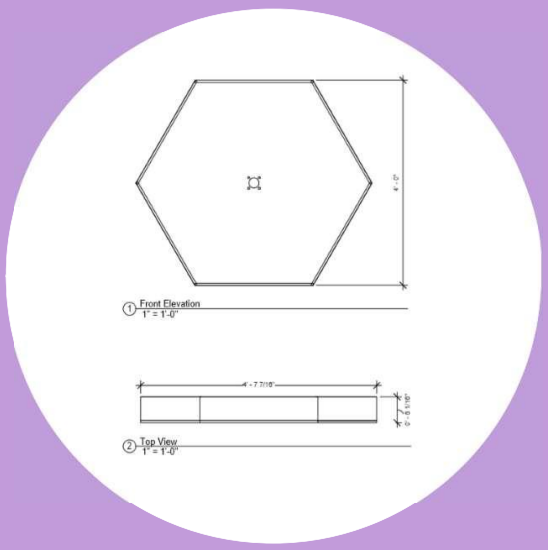
Average heights of kids 8-18 years old:

Age (years)	50th percentile height for boys (inches and centimeters)
8	50.4 in. (128 cm)
9	52.6 in. (133.5 cm)
10	54.5 in. (138.5 cm)
11	56. 4 in. (143.5 cm)
12	58.7 in. (149 cm)
13	61.4 in. (156 cm)
14	64.8 in. (164 cm)
15	66.9 in. (170 cm)
16	68.3 in. (173.5 cm)
17	69.1 in. (175.5 cm)
18	69.3 in. (176 cm)



Universally

Based on the average heights of kids ages 8-18, the sensory wall will be no higher than 60" tall from the ground level.



Construction Drawings

Designs by: Catherine Daron | Fall 2019

Construction Process

The walls face was measured and cut by hand and then fixed to the 6 equal sides to create a perfect hexagon shape. The structure was then sanded, painted, and final components were adhered and screwed in place.

Final Model

Sensational

The final constructed wall is build upon a spindle and hub, allowing the entire wall to be spun 360 degrees so that anyone of any height can access any point of the wall. Sensory items have been adhered to the wall for therapeutic purposes.

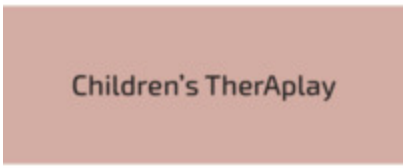
Final Model

Designs by: Catherine Daron | Fall 2019

Design Projects Fall 2020

Watch Video At: https://youtu.be/TQ8ZjLzByCE

Students modified the furniture design that had been done in Fall 2019, the new designs had been installed in Theraplay and students did observations, surveys and data anaylsis.


Children's TherAplay


herAplay Evidence
ased Design | Studio 5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Children's TherAplay


Children's
TherApla
ZEHAVA EFFINGER FALL 2020

Fall 2020

Citation

TherAPlay
EVIDENCE BASED DESIGN

Kelsey Park | Ball State University | IDES 424 | Fall 2021

Children's TherAplay
The Children's TherAplay Foundation, Inc.

Background

TherAplay is an Occupational and Physical Therapy center for children with limited function and mobility. They specialize in hippotherapy as a practice. Hippotherapy is a physical, occupational, and speech therapy that utilizes the movement of a horse to provide motor, and sensory input. It is used for patients with physical and mental disorders.

Renovation Take-Aways (Current)

From previous stages of this project with TherAplay, many conclusions and decisions have been made.

The client, TherAplay, wants a very **natural interior environment** that reflects the calm attributes of the outdoors. The natural elements will be rustic, not polished. The spaces are not to look like a polished cabin and should be very **inclusive and comforting** to the people occupying the space.

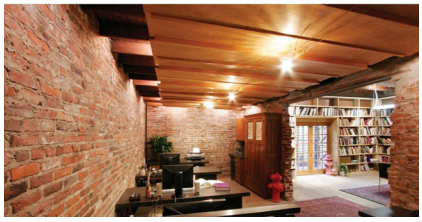
Surveys were conducted to determine what the client wants in the space. The take-aways from these surveys are summarized below:

Exposed physical elements are desired to bring character into the space and add pleasing details and positive distractions while observing the interior space. **Privacy** from personal areas is also important, but maintain the integrity of **natural and barn-like features**.

Organization is important and separate areas between files, books, **storage**, and desks is essential for cleanliness. Having areas to store important materials separate from work spaces helps keep items organized, secure, and private.

Interior windows to connect appropriate rooms is desired for **increased visibility and connectivity**. Open spaces with flexibility in purpose and function is also a consideration. **Windows and natural light** are favored over artificial lighting.

Open concept and open spaces, allowing for personal space between families, is desired heavily. This will help with conversing with people and not increasing volume levels as well as **avoiding overcrowding** and inapproriate distractions for the children attending TherAPlay.



Natural elements with **contrast** is also important for the children so that the space is visually pleasing and clear. The **contrast of colors in materials** and items will help them compartmentalize elements in the space around them.

RESEARCH

Sensory Integration: Materials, Color, and Furniture

Sensory Integration with Cerebral Palsy: Cerebral palsy results in abnormal degree of sensory processing (increased of decreased). Over sensitive and under sensitive feelings can lead to mental and physical distractions or fatigue.

Sensory integration helps children use their senses appropriately and self-regulate. Example: Lack of sensitivity to touch can result in inaccurate perceptions of weight and texture.

Different levels of sensory:
1) Over responsive = avoidance, cautious and fearful
2) Under responsive = withdrawn, passive or difficult to engage
3) Sensory seeking = implusive and take risks

Sensory Integration works to improve different senses by:

1. VISION
    - -neon, patterned, and florescent paper
    - -colored lights, holiday lights
    - -wind-up toys
        - Colors should be introduced for strengthening vision with contrasting colors. Overall muted tones are preferred with pops of color through furniture or patterns to provide a focal point and place of interest for the children to focus on.
2. HEARING
    - -water trickling
    - -music (chimes)
    - -repetition
3. TOUCH
    - -hard = rocks, floors, counters
    - -soft = fur and feathers
    - -surfaces = sticky, rough, pointy, and smooth
4. MOBILITY
    - -throwing a ball
    - -bouncing on a ball
    - -swinging
    - -sliding
        - Mobility in furniture is important, whether the furniture piece moves or the piece requires the individual to move. Swings, exercise balls, walkways, and stairs are beneficial to improve the individual's mobility.

Take-Away

It is important to incorporate a variety of materials and activities that challenge the five sense. Introducing new feelings, sounds, and subtle visual changes is important to help balance out the levels of sensitivity. Providing ways for childrent to see light and colors differently (by their control) is a great way for them to gradually de-sensitive their sense to what could be troubling to their learning.

(Stern, 2020.)

RESEARCH

Lighting Effects with Autism: Lighting and Color

Lighting Effects with Autism:
Lights with mellow colors (like blue) can help kids relax and become creative. Harsh and flickering lights can confuse and harm them. Natural light is also extremely important to help regulate their circadian rhthym.

Therapy Purposes:
-Lights with 10,000 lux and emit no UV light are optimal.
-Best to do light theraping in the morning as they are just waking up.

Do not use florescent lights!

Light is made up of electromagnetic waves and each hue interacts with neuropathways in the brain.
Colors affect mood, behaviors and performance.
Studies decoding the physiological effects of different hues have shown changes in sensory sensitivity, blood pressure, heart rate, and brain development.

Colors like red, orange and yellow provide a high level of stimulus and increase energy and encourage creativity. This is good for kids with autism.

Green helps to relax the nervous system and lessens feelings of stress. It seems to help with communication and developing speech skills. Cool tones may be a good choice for individuals where reducing stimulation is a high priority, such as those with ADHD or the hypersensitive variation of Autism.

Take-Away

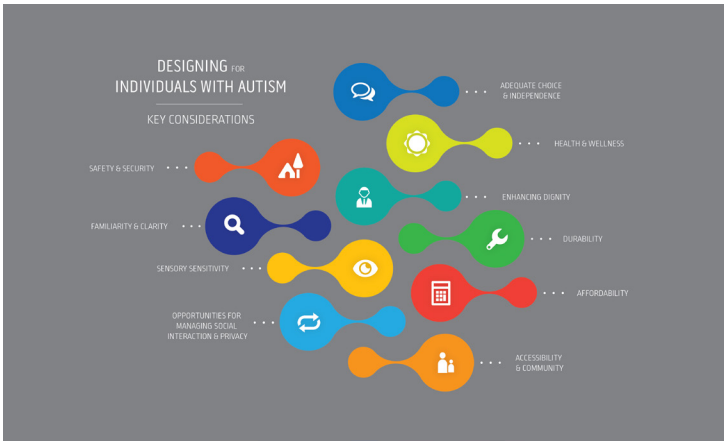
Light therapy is extremely beneficial to children with autism specifically.
Lights can generate a specific emotion or mood based on the color and intensity.
Natural light is most effective and beneficial, so mimicking natural light through artificial light is most comfortable in an indoor space.
Allowing people with autism to adapt to lights of different colors and brightnesses is helpful, as long as florescent lights are avoide since those types of lights often increase anxiety and stress.

(Kimble, *2020.)*
("How Light Can Help Autistic Children." *2020.)*

Designing a Space for Someone with Autism: Acoustics and Wayfinding

Designing a Space for Someone with Autism:
Often times, simplicity is better.
Design factors to heavily consider:
1) Acoustics:
    -provide better sound insulation to minimize distraction and disturbances.
2) Lighting:
    -small areas of bright colors.
    -larger areas of light unsaturated earth tones.
3) Spatial Reasoning:
    -organization.
    -storage to minimize clutter and distractions.
    -wayfinding through repetition.

RESEARCH



Take-Away

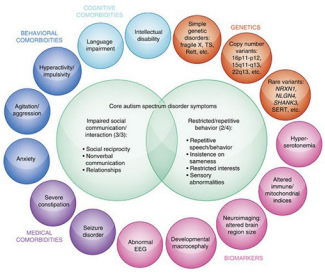
Acoustics are important to minimize distractions from outside areas and decrease pain or confusion. Buffering out harsh noises from outside will help keep children with autism focused.
Wayfinding can be done in a way where color is repeated in an organized way to help them follow a trend or path through the space. Color categorizing areas is effective for this. Organization is important to also help minimize stress and distractions.

("Four Keys to Designing Austistic Friendly Spaces." *2020.)*

CASE STUDY

Designing for the Autistic: First Place Apartments, Arizona

The First Place Apartments are apartments that were designed in Arizona to help adults with autism move to live more independently into a specialy designed apartment complex. The design of the apartments was curated for people with autism, so that they may comfortable use the space. Many elements were implemented to make sure the design would not be disturbing, distracting, or overwhelming.



Colors used throughout the apartment were chosen to promote calmness and relaxation. The selected colors were blue, grey, green, tan, and lavendar.

The design team also carefully included a repeated material palette strategically throughout all spaces to increase familiarity and comfort in public and private rooms. Subtle colored visual paths were used to help with wayfinding.

Natural elements are beneficial as well, promoting calmness and a sense a familiarity and grounding. Designing a floral wall and including foliage throughout spaces stimulates health and well-being. Natural materials in terms of fabrics, paints, and other specifications are often chemical free and have low toxicity levels.

Take-Away

Natural tones are relaxing and soothing, offering familiarity to what is outside. Colors are chosen to create a feeling of calmness and relaxation. Repeating colors and patterns in different rooms makes the spaces feel familiar and inviting. Subtle colored visual paths help with wayfinding throughout the space in addition to the repetative patterns. Natural materials and elements help clean the space and promote well-being.

(Denhardt, 2017.)

OBSERVATION NOTES

TherAplay In-Person Observations

To understand what is needed for the children, and what would be most beneficial for their therapy, three visits were arranged to TherAplay in Carmel, IN.

The first visit was a tour of the facility, the new renovation, and the areas that our focus will be in (new gym and the arena).

Take-aways from first visit/tour:
- Children learn daily skills
- Practice physical therapy and occupational therapy
- Colors, materials, and other sensory related design elements must be carefully considered

The second visit was for a personal observation, and observing the behavior of the children in the arena (hippotherapy) and in the gym. This observation helped understand common behaviors of the children and to better understand what types of activities they do and practive while at TherAplay.

Take-aways from first observation:
- Practive fine motor skills and daily routines
- Muted colors make them calmer and less distracted
- Noise can be distracting

The third visit was for another observation, but this observation focused on furniture pieces and equipment used by the children. We observed the use and functions of a specific piece of equipment in the gym area.

Take-aways from second observation:
- Enjoy fun designs and colors
- Most common activites include life skills
- Practice their independence
- Enjoy games

Discussion With TherAplay Employee

While at TherAplay, some main 'needs' in terms of equipment pieces, furniture, and activities for the children were provided to us by a TherAplay employee.
She mentioned that activities along the wall of the arena for the children to interact with while they rode horses would be beneficial.

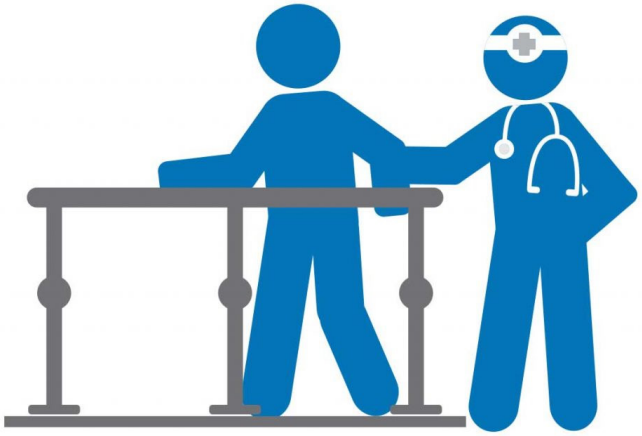
Some ideas based off this were:
- Mail boxes
- Cork board / Magnetic board
- Peg board

Moving into the gym area, she mentioned some pieces that would be beneficial to the children to practice in there that would transfer to real-life skills.

Some ideas based off this were:
- Sensory wall
- Swing
- Stairs
- Balance Chair

After considering the needs and possibilities for what to create to be in TherAplay, I decided to combine a few ideas into one... I plan to create a stair piece that also has a small sensory wall at the top.
This will be able to practice both physical therapy in the act of walking up steps, and work on fine motor skills and sensory adaptation with elements on the sensory wall.

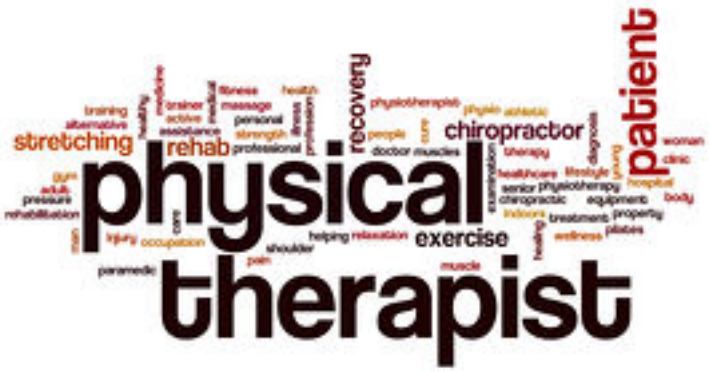
CONCEPT



To achieve the needs of the clients, the concept behing my design is to create a dynamic piece that meets both the needs of physical therapy and sensory adaptations.

Combining the elements of a physical therapy piece that practices muscle control and mobility, with a piece that also contributes to sensory integration.

To acieve both of these elements and goals in a furniture piece, I decided to use a stair piece for the physical therapy piece to integrate the concept of children walking up and down stairs independently, assisted by a hand rail or therapist. This is an important skill since stairs are encountered often throughout daily life. Then, to integrate an element of sensory, I will incorporate a sensory wall and activities of some kind that will be attached or built into the stair case.



DESIGN IDEAS

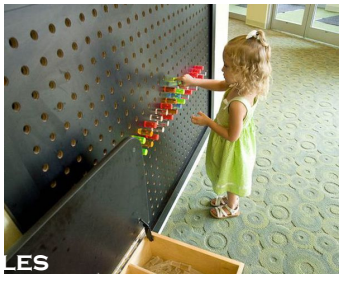
Client Needs / Wants

-Furniture Piece
-Elements that promote daily exercises
-Peg board wall in arena
-Activities for fine motor skills
-Safety considerations

Furniture Idea

Combine the designs of a play stair set, with the option of storage, as well as an interactive wall/side.
The stairs would provide a physical obstacle for kids to practice muscle control on. The option of have storage offers organization and cleanliness to the space without taking up other purposeful space in the room. An interactive side/wall would allow the stairs to have functions for physical and mental/ cognitive practices. Shapes, pegs, and lights of different kinds could be combined into the element for an interactive station.

Basic Structure



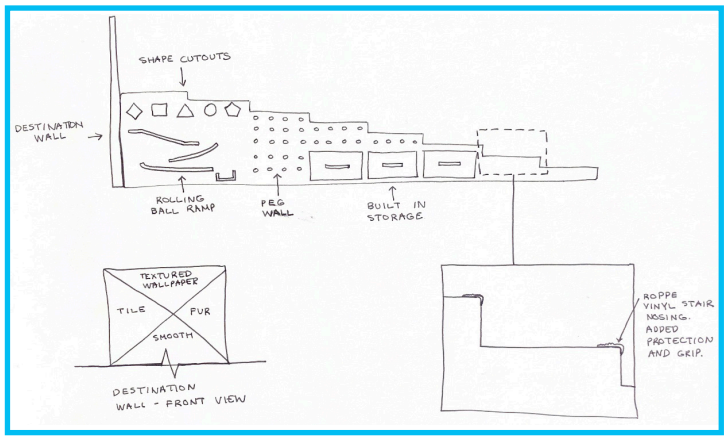
Interactive Wall Examples

These photos demonstrate interactive items that would work on fine motor skills and cognitive practices.
Incorporating elements of color and shape will promote visual learning while the movement of pieces throughout the interactive wall will help with fine motor skills.

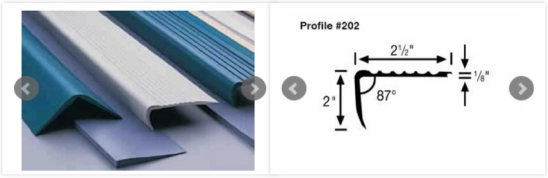
The addition of adding elements of different materials; fur, feathers, leather, wood; will help with feeling and touch as well.

The piece itself is focused on physical therapy by having children walk up steps using their muscles to balance and step up.
Walking up and down stairs is a life-skill, something that TherAplay wants to focus on strengthening in each child!

Preliminary Sketches



The steps have been shortened to be less height per step. This is to help the kids really be able to do the stairs on their own without much need of assistance.
This is good practice for their mobility on steps and balancing as they move upwards.

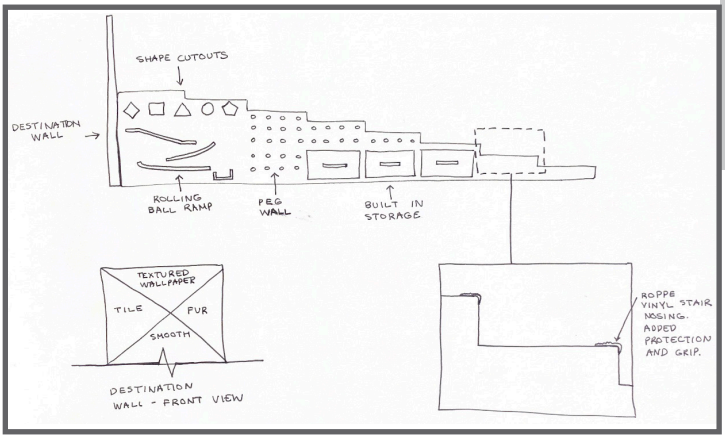


Roppe Vinyl Stair nosing woud add protection to the stair corners, making them less dangerous as children travel up the steps.

DESIGN IDEAS

The end destination of the stairs is a texture wall, incorporating different types of materials for the children to feel.
The different materials would introduce them soft, hard, smooth, and course surfaces.
This is important so they have a sense of touch and feeling.

Therapist's Feedback



The therapist for TherAplay will approve all ideas and provide suggestions based on knowledge of what is important and essential for the children.

Jessica Boram, the therapist, received my initial ideas and preliminary sketches for the furniture piece [as seen above].

Her feedback is crucial to moving forward as certain standards may be different when installing pieces for kids with disabilities.

Feedback Email:

Hi Kelsey!

I love the stair option with storage solution! The stairs will be placed up against the wall so we will only have access to one side and we would need railing on the side with the storage for safety. Ideally the left side of the stairs will be placed up against the wall. The ceiling height is also limited to 8 feet, so we will need to take that into consideration when planning the final height of the top platform. The steps will also need to be standard ADA height and depth to complete standardized testing. Thank you so much for your hard work!

Thank you,

Jessica Boram PT, DPT

Physical Therapist
9919 Towne Road, Carmel, IN 46032

Main office (317) 872-4166

www.childrenstheraplay.org

Take-Away

Moving forward with the design development, consider and add the following:
-Railing on the outside edge of the stairs for support
-Leave minimum of 5'-0" of space from the top of the platform to the ceiling of 8'-0"; making the platform no more than 3'-0" in height
-Steps will need to be standard ADA height and depth to complete standardized testing

REFINED DESIGN

Further Research

Taking in to consideration the feedback of the therapist, it is important to appy ADA standards required for this furniture piece.

STEPS:
The ADA standard for a stair depth, or tread, is minimum of 11 inches.

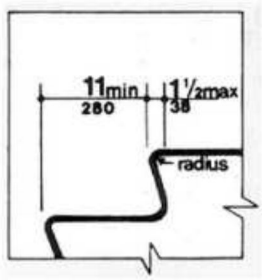


Figure 18a
Usable Tread Width and Examples of Acceptable Nosings - Flush Riser

The riser height standard is minimum of 4 inches and maximum of 7 inches.

HANDRAILS:
Handrails are to be continuous along the steps. There shall be a 12 inch minimum extension at the bottom and top of the stairs.

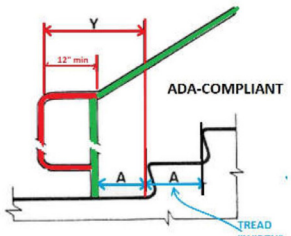
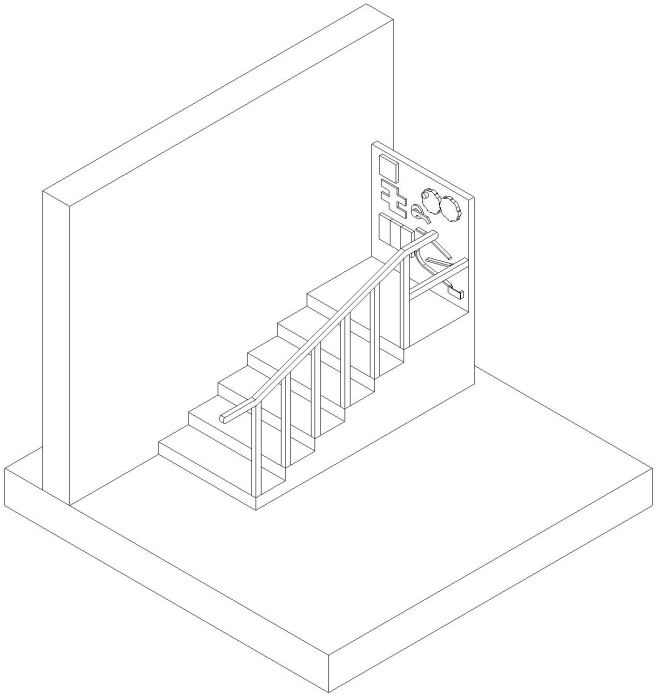


Figure 19c
Stair Handrails - Extension at Bottom of Run

Handrails are also required to be 31.5 inches above the stair nosing when applied to one side.

Per my design, it will be placed up against a wall, so only one handrail is required on the exterior side of the stairs.

These standardized dimensions will be applied to the required dimension to not have the top platform higher than 3'-0" in the space.



Shown above is a 3D depiction of the piece done in Revit, with the added elements requested by the therapist.
This 3D model does accurately depict the size next to the 8'-0" wall.
The stair width is the standard 36 inches.
Since the sensory wall was placed as the 'goal' and destination at the top of the stairs.

Storage drawers will help hold other activities and equipment, and help children with their skills to open and close the drawers.

The option to make the stair piece three separate pieces that can be put together for easy transportation are ideal.
The piece would be divided as the stairs, the platform, and the sensory wall.

The railing would be able to be inserted into the stairs with slots where they would fit.

DESIGN DETAILS

Further Research

Now that the stair piece has been developed into a rough model and depicted into shape, size, and design elements, design details can be specified.

MATERIALS:

The stair case will be made entirely out of Spruce Wood, unless noted otherwise.

The sensory wall will include elements such as: fur, brick texture, sparkle texture, metal, mirror, and wood. The sensory wall will also contain colors such as blue, purpe, green, and muted red. These colors will be able to capture the children's attention, focus, and interest without being overwhelming.

JOINTS AND CONNECTIONS:

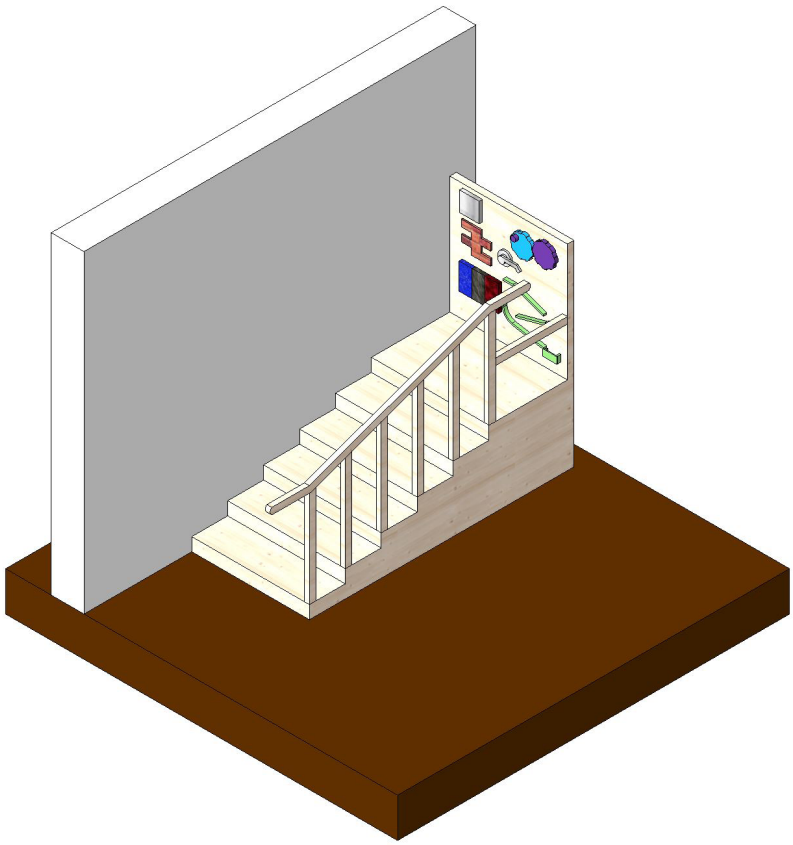
The piece will be connected through nails, screws, and nail glue for permanent connections.
For areas of connection that can be taken apart during transportation, pegs and holes will be used for sliding and locking into place.

All these details are explained and depicted clearly in the Construction Documents for this furniture piece.

A material realistic image of the furniture piece is shown below.

Following this page are the set of Construction Documents for the building of the stair piece and sensory wall.

The construction documents provide information to build the piece of furniture as well as a realistic rendering of what the piece would look like in a space with 8'-0" ceilings, same as the gym at TherAplay.



SENSORY STAIR FURNITURE PIECE

1	REALISTIC RENDERING

GENERIC FURNITURE PIECE NOTES:

IMAGE NOTES:
IN THE ABOVE 3D MODEL IMAGE, THE STAIR PIECE IS SHOWN PLACED UP AGAINST AN 8 FOOT WALL..

FURNITURE PIECE DETAILS:
THE PIECE IS TO BE CONSTRUCTED OUT OF SPRUCE WOOD OF 3/4 INCH THICKNESS, UNLESS NOTED OTHERWISE.
**NOT SHOWN IN THE 3D VIEW ARE THE CONNECTING ELEMENTS AND JOINTS BETWEEN DIFFERENT PIECES. ALL PIECES ARE CONNECTED BY EITHER SCREWS, NAILS, AND/OR NAIL GLUE.

THE PIECE IS CONSTRUCTED IN FOUR SEPARATE PIECES FOR EASE OF TAKING APART FOR TRANSPORTATION. THE PIECES ARE STAIRS, PLATFORM, SENSORY WALL, AND RAILING.THE VDs FOR EACH OF THESE PIECES ARE INCLUDED IN THAT ORDER.

SENSORY WALL DETAILS:
THE SENSORY WALL IS MADE UP OF SEVERAL ELEMENTS FOR FINE MOTOR SKILLS AND SENSORY FUNCTIONS.
SHOWN IN THIS PARTICULAR DESIGNS ARE ELEMENTS SUCH AS:
-MIRROR
-BRICK TEXTURE
-THREE VARIETY TEXTURE MATERIALS
-DOOR HANDLE
-COG WHEELS
-BALL RAMP
THE SENSOR WALL PIECES ARE DETAILED ON SHEET A103.

INDEX

Children's TherAplay
The Children's TherAplay Foundation, Inc.

THERAPLAY FURNITURE PIECE PROJECT

CARMEL, IN

DESIGNING FURNITURE FOR OCCUPATIONAL AND PHYSICAL THERAPY PURPOSES

BALL STATE UNIVERSITY

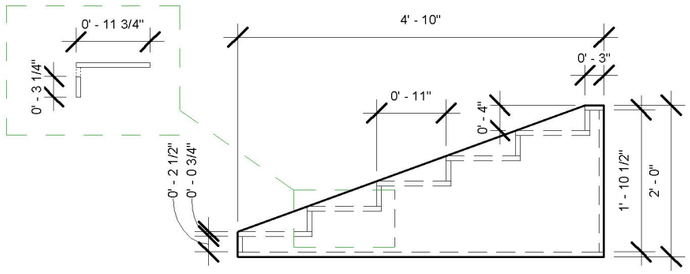
BALL STATE UNIVERSITY IMMERSIVE LEARNING PROGRAM

DRAWN BY	KELSEY PARK
COMPANY	BALL STATE UNIVERSITY INTERIOR DESIGN IDES 424 FALL 2020
CLIENT	THERAPLAY
DATE	

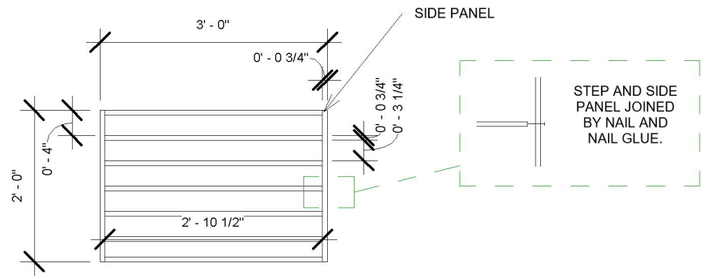
SCALE: 1/2" = 1'-0"

SHEET: G100

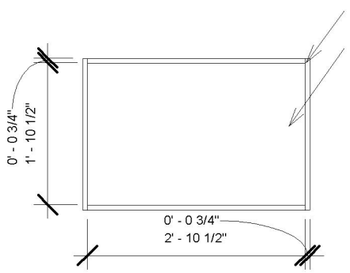
PIECE A: STAIR PIECE



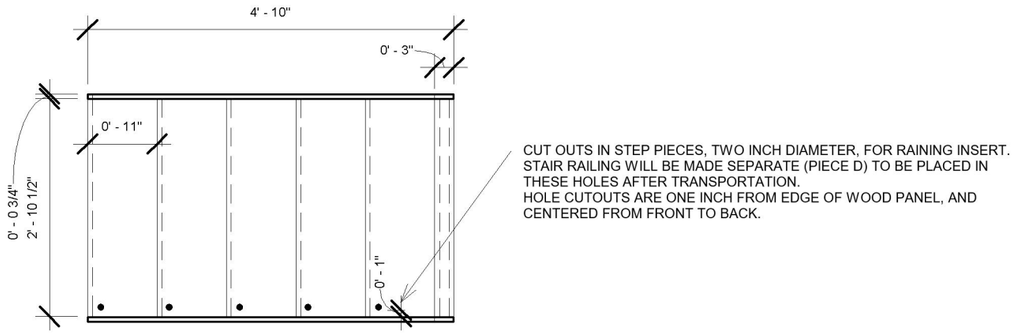
1 SIDE VIEW



2 FRONT VIEW



3 BACK VIEW

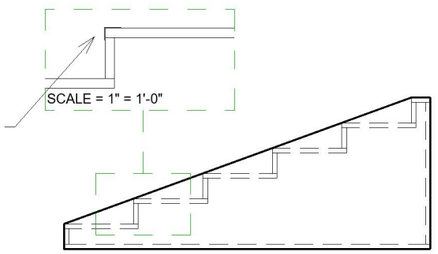


4 TOP VIEW

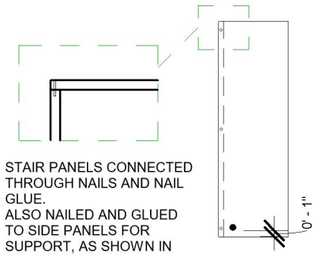
DETAILED STAIR NOTES:

5A

ROPPE VINYL STAIR NOSING WILL BE PLACED ON EACH STEP CORNER FOR ADDED PROTECTION AND GRIP AS CHILDREN TRAVEL UP THE STEPS. SIX STRIPS OF ROPPE VINYL STAIR NOSING NEEDED.

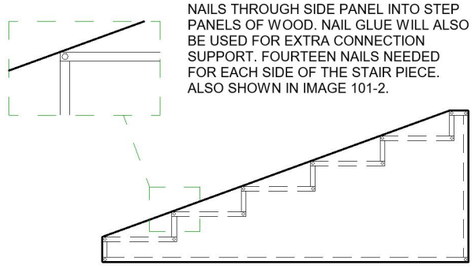


5B



STAIR PANELS CONNECTED THROUGH NAILS AND NAIL GLUE.
ALSO NAILED AND GLUED TO SIDE PANELS FOR SUPPORT, AS SHOWN IN IMAGE A101-2.
THREE NAILS SPACED ALONG EDGE OF BOARD.

5C



NAILS THROUGH SIDE PANEL INTO STEP PANELS OF WOOD. NAIL GLUE WILL ALSO BE USED FOR EXTRA CONNECTION SUPPORT. FOURTEEN NAILS NEEDED FOR EACH SIDE OF THE STAIR PIECE. ALSO SHOWN IN IMAGE 101-2.

Children's TherAplay
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THERAPLAY FURNITURE PIECE PROJECT

CARMEL, IN

DESIGNING FURNITURE FOR OCCUPATIONAL AND PHYSICAL THERAPY PURPOSES

BALL STATE UNIVERSITY

BALL STATE UNIVERSITY IMMERSIVE LEARNING PROGRAM

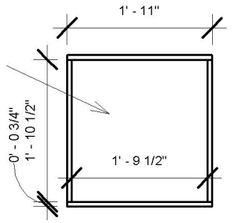
DRAWN BY	KELSEY PARK
COMPANY	BALL STATE UNIVERSITY INTERIOR DESIGN IDES 424 FALL 2020
CLIENT	THERAPLAY
DATE	

SCALE: 1/2" = 1'-0"

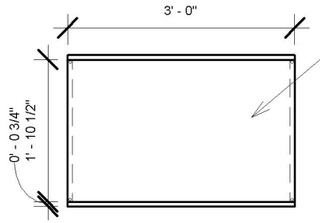
SHEET: A101

PIECE B: PLATFORM PIECE

FACING OUTWARD OF WALL.



1 SIDE VIEW

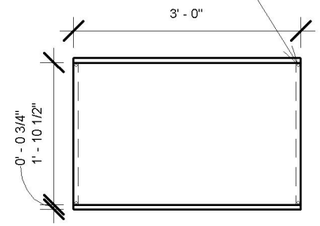


THIS SIDE WILL BE PLACED AGAINST THE "A" PIECE.

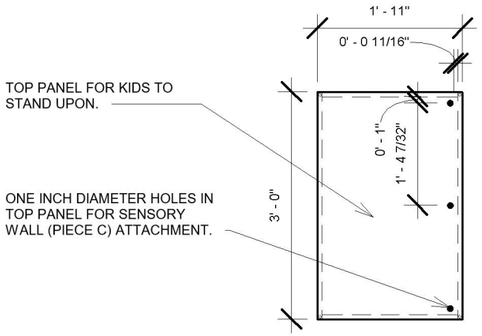
FOUR NAILS USED ON FRONT AND BACK SIDE, CONNECTING THROUGH TO SIDE PANELS.

2 FRONT VIEW

NAIL PLACED THROUGH BACK PANEL INTO SIDE PANELS.



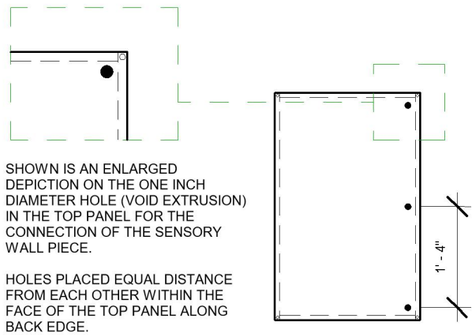
3 BACK VIEW



4 TOP VIEW

DETAILED PLATFORM NOTES:

5A

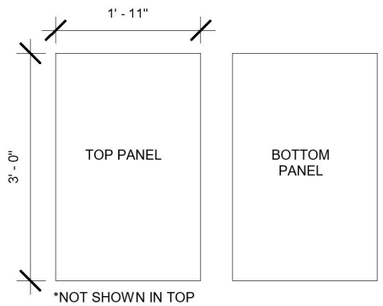


SHOWN IS AN ENLARGED DEPICTION ON THE ONE INCH DIAMETER HOLE (VOID EXTRUSION) IN THE TOP PANEL FOR THE CONNECTION OF THE SENSORY WALL PIECE.

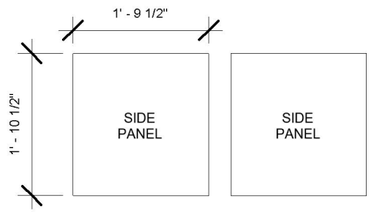
HOLES PLACED EQUAL DISTANCE FROM EACH OTHER WITHIN THE FACE OF THE TOP PANEL ALONG BACK EDGE.

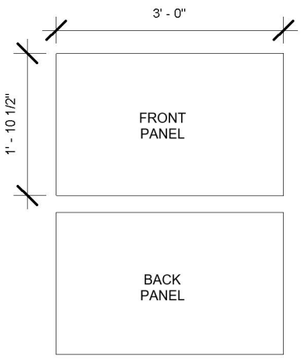
5B

NOTE:
ALL 'SIDE' FRAME PIECES ARE A HEIGHT OF 1'-10 1/2". THE REST INBETWEEN THE TOP AND BOTTOM PANELS. THE TOP AND BOTTOM PANELS ADD AN EXTRA 3/4" EACH, MAKING THE TOTAL HEIGHT OF THE PIECE 2'-0". THE TOP AND BOTTOM PANELS COVER THE PIECE EDGE TO EDGE, BOTH BEING DIMENSIONED AT 1'-11" D x 3'-0" W.



*NOT SHOWN IN TOP PANEL HERE ARE THE THREE HOLES FOR SENSORY WALL ATTACHMENT.





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CARMEL, IN

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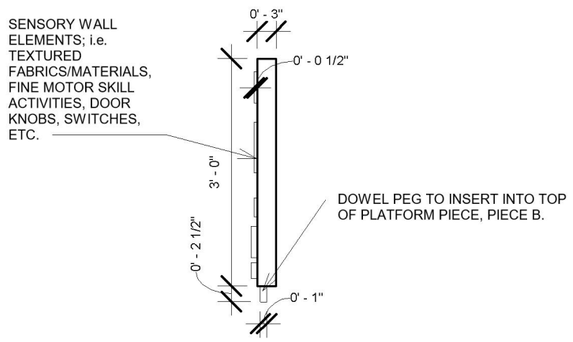
DATE	

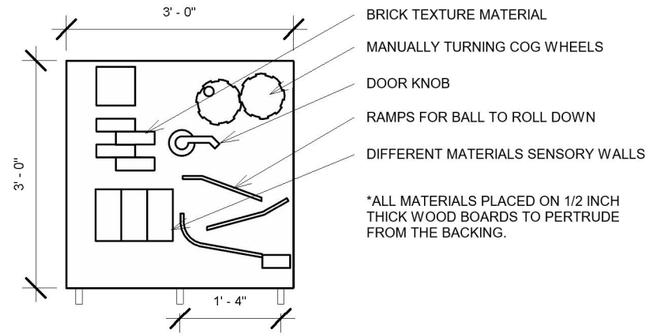
SCALE: 1/2" = 1'-0"

SHEET: A102

PIECE C: SENSORY WALL PIECE



1 SIDE VIEW



2 FRONT VIEW

DETAILED PLATFORM NOTES:

NOTE:
PEGS ARE 1 INCH DIAMETER BY 2.5 INCHES LONG SCREWED INTO THE BOTTOM OF THE SENSORY WALL.
THEY ARE EVENLY SPACED 16 INCHES O.C.

SENSORY WALL ELEMENTS ARE APPLIED TO THE SENSORY WALL VIA RUBBER CEMENT GLUE OR SCREWS.

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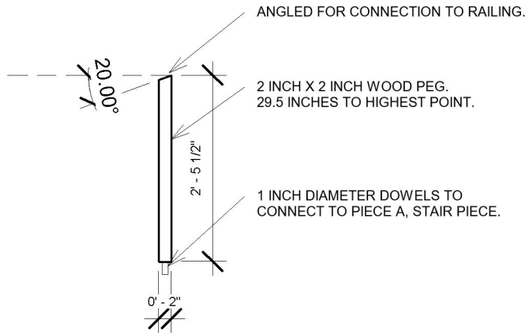
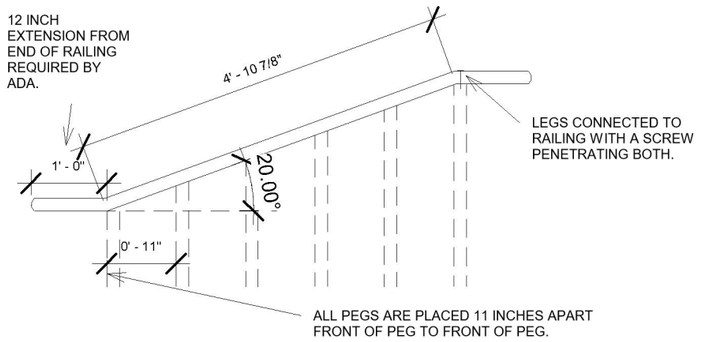
SCALE: 1/2" = 1'-0"

SHEET: A103

PIECE D: HAND RAIL PIECE



1	RAIL LEG - SIDE VIEW



2	RAILING - SIDE VIEW

DETAILED HANDRAIL NOTES:

NOTE:
RAILING LEGS ARE 2 INCH X 2 INCH (SQUARED).
THE 1 INCH DIAMETER ROUND DOWELS EXTENDING OUT OF THE RAILING LEGS ARE TO CONNECT INTO THE STAIR PIECE.
THE TALLEST POINT OF THE RAILING LEG REACHS 2 FEET 5 1/2 INCHES, WHICH IS THEN CUT DOWN AT A 20 DEGREE ANGLE FOR THE HAND RAIL TO REST UPON.

THE LENGTH OF THE ANGLED HAND RAIL IS 4 FEET 10 7/8 INCH, WITH 1 FOOT HORIZONTAL EXTENSIONS AT EITHER END.
THE LEGS ARE CONNECTED TO THE RAILING WITH A SCREW PENETRATING THROUGH THE RAIL INTO THE LEG, SHOWN IN FIGURE 104-2.

Children's TherAplay
The Children's TherAplay Foundation, Inc.

THERAPLAY FURNITURE PIECE PROJECT

CARMEL, IN

DESIGNING FURNITURE FOR OCCUPATIONAL AND PHYSICAL THERAPY PURPOSES

BALL STATE UNIVERSITY

BALL STATE UNIVERSITY IMMERSIVE LEARNING PROGRAM

DRAWN BY	KELSEY PARK
COMPANY	BALL STATE UNIVERSITY INTERIOR DESIGN IDES 424 FALL 2020
CLIENT	THERAPLAY
DATE	

SCALE: 1/2" = 1'-0"

SHEET: A103